

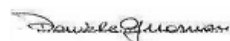
TEST REPORT

ETSI EN 301 489-6 v 1.2.1 (2002)

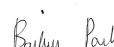
Electromagnetic Compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 6: Specific conditions for Digital Enhanced Telecommunications (DECT) equipment

Report Reference No. : 109463R1TRFEMC

Tested by (name+signature) : D. Guarnone



Tested by (name+signature)..... : P. Barbieri



Date of issue : 2008-07-15

Testing Laboratory : **Nemko Spa**

Address : Via del Carroccio, 4
I-20046 Biassono MI (Italy)

Testing location/ procedure : Full application of Harmonised standards ☒
Partial application of Harmonised standards ☐
Other standard testing methods ☐
Non-standard testing methods ☐

Testing location/ address : Nemko Spa - Via del Carroccio, 4 - I-20046 Biassono MI (Italy)

Applicant's name : **Shenzen Guo Wei Electronics Co.Ltd**

Address : **n°68 Guowei Road Liantang Industrial District She nzen**

Test specification:

Standard..... : ETSI EN 301 489-1 v 1.6.1 (2005)
ETSI EN 301 489-6 v 1.2.1 (2002)

Test procedure : NEMKO WML0177 and WML1002

Non-standard test method..... : N/A

Test Report Form No. : TRF EMC SpA

TRF Originator : Nemko Spa

Master TRF : 2005-04

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Test item description : DECT Cordless Phone

Trade Mark..... : --

Manufacturer : **Shenzen Guo Wei Electronics Co.Ltd**

Model/Type reference : DECT20 -C08

Ratings : 100 ÷ 240 Vac, 50/60Hz, 0.2A (Base with AC/DC adapter)
2 x 1.2V, 550mAh (Handset)

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EMC -- TEST REPORT

Test Report No. :	109463R1TRFEMC	2008-07-15 Date of issue
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Type / Model :DECT20 –C08

Equipment :The E.U.T. was composed of the followings units:
- Base station with AC/DC adapter;
- Handset.

Applicant :Shenzen Guo Wei Electronics Co.Ltd

Address :n°68 Guowei Road Liantang Industrial Disctrict She nzen

Manufacturer :Shenzen Guo Wei Electronics Co.Ltd

Address :n°68 Guowei Road Liantang Industrial Disctrict She nzen

Test Result according to the standards on page 4:	POSITIVE
--	-----------------

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1 TEST STANDARDS

The tests were performed according to following standards:

NEMKO WM L0177: Use of measuring equipment to perform standards tests.

NEMKO WM L1002: Measurement Uncertainty - Policy and Statement

ETSI EN 301 489-1 v 1.6.1 (2005-09)

Electromagnetic Compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common Technical Requirements.

ETSI EN 301 489-6 v 1.2.1 (2002-08)

Electromagnetic Compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 6: Specific conditions for Digital Enhanced Telecommunications (DECT) equipment

EN 55022 (2006)

Information technology equipment – Radio disturbance characteristics - Limits and methods of measurement

EN 61000-4-2 (1995) + A1 (1998) + A2 (2001)

Electromagnetic compatibility (EMC) -- Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test

EN 61000-4-3 (2006)

Electromagnetic compatibility (EMC) -- Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test

EN 61000-4-4 (2004)

Electromagnetic compatibility (EMC) -- Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test

EN 61000-4-5 (2006)

Electromagnetic compatibility (EMC) -- Part 4-5: Testing and measurement techniques - Surge immunity test

EN 61000-4-6 (2007)

Electromagnetic compatibility (EMC) -- Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields

EN 61000-4-11 (2004)

Electromagnetic compatibility (EMC) -- Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests

2 SUMMARY

GENERAL REMARKS:

\\

FINAL ASSESSMENT:

The EMC requirements pertaining to the technical standards and tested operation modes are

- -Fulfilled.

The equipment under test

- - Fulfils the EMC requirements cited on page 4.

Date of receipt of test sample : 2008-06-30

Testing commenced on : 2008-06-30

Testing concluded on : 2008-07-15

3.3 Performance level

The CPP was tested according to par. 5.3 of ETSI EN 301 489-6: (ref. to fig. 1 of ETSI EN 301 489-6) placed inside the test environment and adjusting telephone line signal to have 0dBPa at 1 kHz at the Ear Reference Point (ERP) when testing “uplink” (a call from telephone line to handset); (ref. to fig. 2 of ETSI EN 301 489-6) placed inside the test environment and providing –5 dBPa at 1 kHz to the Mouth Reference Point (MRP) when testing “downlink” (a call from handset to the telephone line)
The CFP was tested according to par. 5.3 of ETSI EN 301 489-6: placed inside the test environment and adjusting the reference levels for “uplink” and “downlink” in way to obtain the acoustic signals described in 5.2.1 and 5.2.2. For particular test conditions see remarks in detailed page of the relevant test.

Parameter evaluated during immunity tests:

- No loss of functions or of stored data is allowed (when performance criteria CT/CR and TT/TR are applied);
- Communication link shall be maintained (when performance criteria CT/CR and TT/TR are applied).
- No unintentional transmission responses are allowed (when performance criteria CT and TT are applied).
- Signal to Noise Audio Ratio (S/N) shall be at least 35 dB (when performance criteria CT/CR are applied);

Definition related to the performance level:

- based on the used product standard
- o based on the declaration of the manufacturer, requestor or purchaser

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

Nemko Spa
Via del Carroccio, 4
I-20046 Biassono MI

4.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 18-27 °C

Humidity: 30-60 %

Atmospheric pressure: 860-1060 hPa

4.3 Definitions of symbols used in this test report

- -The black square indicates that the listed condition, standard or equipment is applicable for this report.
- -The empty circle indicates that the listed condition, standard or equipment is **not** applicable for this report.

4.4 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Nemko Technical Procedure WML1002. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Nemko Spa laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	Antenna distance 3m (30÷200) MHz	± 5.2 dB	(1)
	Antenna distance 3m (200÷1000) MHz	± 4.9 dB	(1)
	Antenna distance 10m (30÷200) MHz	± 5.0 dB	(1)
	Antenna distance 10m (200÷1000) MHz	± 4.8 dB	(1)
Conducted Emission	9 kHz ÷ 30 MHz	± 2.8 dB	(1)
Clicks	9 kHz ÷ 30 MHz	± 2.8 dB	(1)
Radiated Power Emission	(30÷300) MHz	± 4.0 dB	(1)
Harmonic Current Emission	50 Hz ÷ 2 kHz	± 2%	(1)
Voltage Fluctuation Emission	--	± 2%	(1)
Radiated Immunity	20 MHz ÷ 2.5 GHz	(0.0 ÷ 6.0) dB	(1)
Conducted RF Immunity	9 kHz ÷ 230 MHz	± 2.0 dB	(1)
ESD Immunity	--	± 6%	(1)
Burst Immunity	--	± 2%	(1)
Surge Immunity	--	± 2%	(1)
Dips Immunity	--	± 2%	(1)
Magnetic Field Immunity	50 Hz	± 2.0dB	(1)
Damped Magnetic Field Immunity	100 kHz, 1 MHz	± 3 dB ampl. ± 10% freq.	(1)
Oscillatory Wave Immunity	100 kHz, 1 MHz	± 20%	(1)
Low Frequency Immunity	15 Hz ÷ 150 kHz	± 2.0 dB	(1)

NOTES:

- (1) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$ which has been derived from the assumed normal probability distribution with infinite degrees of freedom and for a coverage probability of 95 %;

5 TEST CONDITIONS AND RESULTS

5.1 Conducted disturbance

For test instruments and accessories used see section 6.

5.1.1 Description of the test location

Test location: Shielded room

5.1.2 Photo documentation of the test set-up



5.1.3 Test result

The requirements are **Fulfilled**

Frequency range: 0.15 MHz - 30 MHz

Min. limit margin None

Remarks: The limits are kept. For detailed results, please see the following page(s).

5.1.4 Test protocol

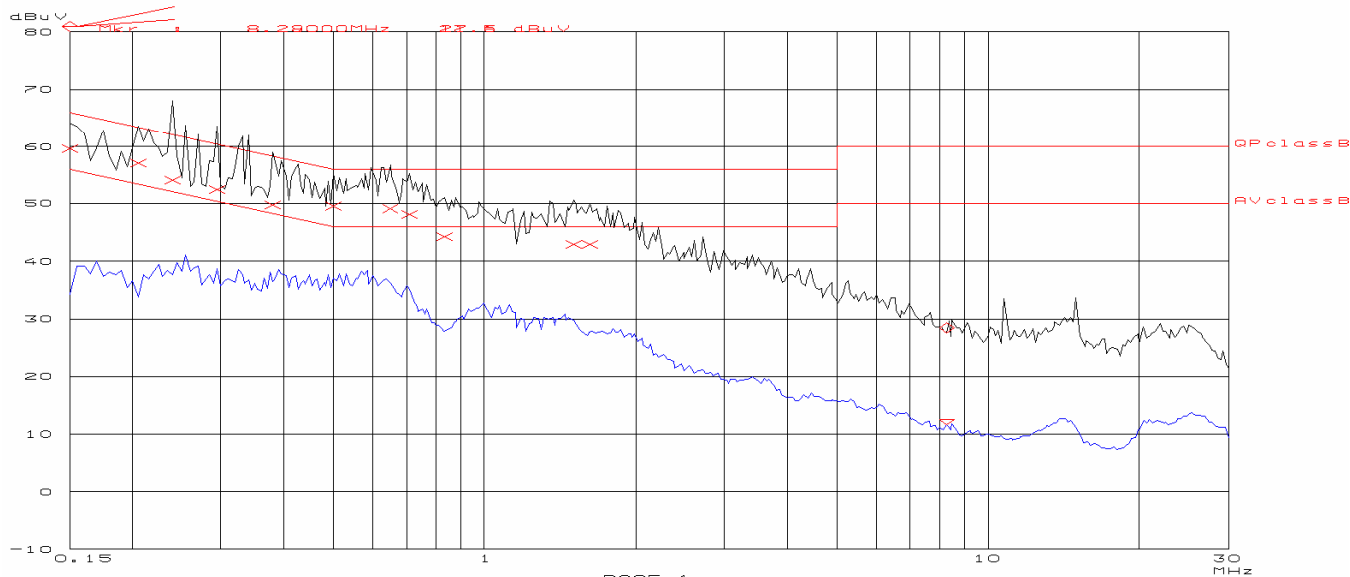
Test point
Operation mode:
Remarks:

Phase line
Operating mode 1
--

Result: ■ - passed

Nemko S.p.A. EMC Lab.
CONDUCTED EMISSIONS ON AC MAINS

EUT: DECT 20-C08
Manuf: Shenzhen
Op Cof: See relevant paragraph of test report
Operatod: DECT 20-C08
Test Spec: EN 55022 class B
Comment: charging phase line



Nemko S.p.A. EMC Lab.
CONDUCTED EMISSIONS ON AC MAINS

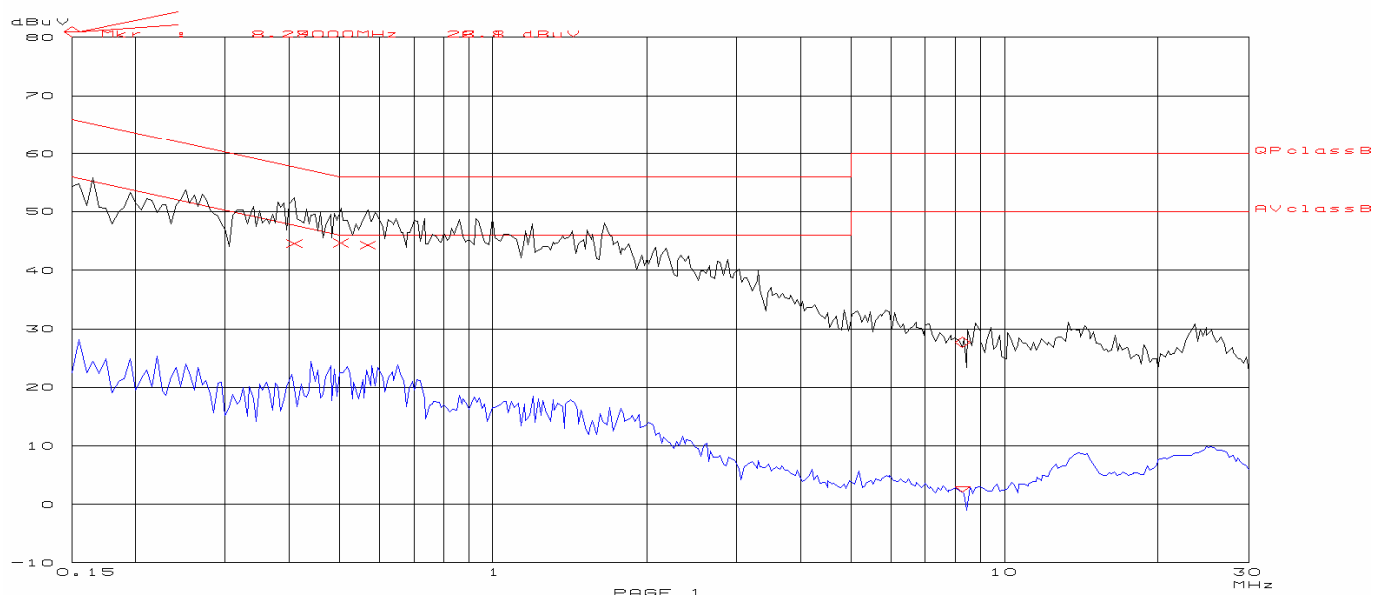
EUT: DECT 20-C08
Manuf: Shenzhen
Op Cof: See relevant paragraph of test report
Operatod: DECT 20-C08
Test Spec: EN 55022 class B
Comment: charging phase line

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.150000	65.00	60.00
0.200000	64.70	60.00
0.250000	64.40	60.00
0.300000	64.10	60.00
0.350000	63.80	60.00
0.400000	63.50	60.00
0.450000	63.20	60.00
0.500000	62.90	60.00
0.550000	62.60	60.00
0.600000	62.30	60.00
0.650000	62.00	60.00
0.700000	61.70	60.00
0.750000	61.40	60.00
0.800000	61.10	60.00
0.850000	60.80	60.00
0.900000	60.50	60.00
0.950000	60.20	60.00
1.000000	59.90	60.00
1.050000	59.60	60.00
1.100000	59.30	60.00
1.150000	59.00	60.00
1.200000	58.70	60.00
1.250000	58.40	60.00
1.300000	58.10	60.00
1.350000	57.80	60.00
1.400000	57.50	60.00
1.450000	57.20	60.00
1.500000	56.90	60.00
1.550000	56.60	60.00
1.600000	56.30	60.00
1.650000	56.00	60.00
1.700000	55.70	60.00
1.750000	55.40	60.00
1.800000	55.10	60.00
1.850000	54.80	60.00
1.900000	54.50	60.00
1.950000	54.20	60.00
2.000000	53.90	60.00
2.050000	53.60	60.00
2.100000	53.30	60.00
2.150000	53.00	60.00
2.200000	52.70	60.00
2.250000	52.40	60.00
2.300000	52.10	60.00
2.350000	51.80	60.00
2.400000	51.50	60.00
2.450000	51.20	60.00
2.500000	50.90	60.00
2.550000	50.60	60.00
2.600000	50.30	60.00
2.650000	50.00	60.00
2.700000	49.70	60.00
2.750000	49.40	60.00
2.800000	49.10	60.00
2.850000	48.80	60.00
2.900000	48.50	60.00
2.950000	48.20	60.00
3.000000	47.90	60.00
3.050000	47.60	60.00
3.100000	47.30	60.00
3.150000	47.00	60.00
3.200000	46.70	60.00
3.250000	46.40	60.00
3.300000	46.10	60.00
3.350000	45.80	60.00
3.400000	45.50	60.00
3.450000	45.20	60.00
3.500000	44.90	60.00
3.550000	44.60	60.00
3.600000	44.30	60.00
3.650000	44.00	60.00
3.700000	43.70	60.00
3.750000	43.40	60.00
3.800000	43.10	60.00
3.850000	42.80	60.00
3.900000	42.50	60.00
3.950000	42.20	60.00
4.000000	41.90	60.00
4.050000	41.60	60.00
4.100000	41.30	60.00
4.150000	41.00	60.00
4.200000	40.70	60.00
4.250000	40.40	60.00
4.300000	40.10	60.00
4.350000	39.80	60.00
4.400000	39.50	60.00
4.450000	39.20	60.00
4.500000	38.90	60.00
4.550000	38.60	60.00
4.600000	38.30	60.00
4.650000	38.00	60.00
4.700000	37.70	60.00
4.750000	37.40	60.00
4.800000	37.10	60.00
4.850000	36.80	60.00
4.900000	36.50	60.00
4.950000	36.20	60.00
5.000000	35.90	60.00
5.050000	35.60	60.00
5.100000	35.30	60.00
5.150000	35.00	60.00
5.200000	34.70	60.00
5.250000	34.40	60.00
5.300000	34.10	60.00
5.350000	33.80	60.00
5.400000	33.50	60.00
5.450000	33.20	60.00
5.500000	32.90	60.00
5.550000	32.60	60.00
5.600000	32.30	60.00
5.650000	32.00	60.00
5.700000	31.70	60.00
5.750000	31.40	60.00
5.800000	31.10	60.00
5.850000	30.80	60.00
5.900000	30.50	60.00
5.950000	30.20	60.00
6.000000	29.90	60.00
6.050000	29.60	60.00
6.100000	29.30	60.00
6.150000	29.00	60.00
6.200000	28.70	60.00
6.250000	28.40	60.00
6.300000	28.10	60.00
6.350000	27.80	60.00
6.400000	27.50	60.00
6.450000	27.20	60.00
6.500000	26.90	60.00
6.550000	26.60	60.00
6.600000	26.30	60.00
6.650000	26.00	60.00
6.700000	25.70	60.00
6.750000	25.40	60.00
6.800000	25.10	60.00
6.850000	24.80	60.00
6.900000	24.50	60.00
6.950000	24.20	60.00
7.000000	23.90	60.00
7.050000	23.60	60.00
7.100000	23.30	60.00
7.150000	23.00	60.00
7.200000	22.70	60.00
7.250000	22.40	60.00
7.300000	22.10	60.00
7.350000	21.80	60.00
7.400000	21.50	60.00
7.450000	21.20	60.00
7.500000	20.90	60.00
7.550000	20.60	60.00
7.600000	20.30	60.00
7.650000	20.00	60.00
7.700000	19.70	60.00
7.750000	19.40	60.00
7.800000	19.10	60.00
7.850000	18.80	60.00
7.900000	18.50	60.00
7.950000	18.20	60.00
8.000000	17.90	60.00
8.050000	17.60	60.00
8.100000	17.30	60.00
8.150000	17.00	60.00
8.200000	16.70	60.00
8.250000	16.40	60.00
8.300000	16.10	60.00
8.350000	15.80	60.00
8.400000	15.50	60.00
8.450000	15.20	60.00
8.500000	14.90	60.00
8.550000	14.60	60.00
8.600000	14.30	60.00
8.650000	14.00	60.00
8.700000	13.70	60.00
8.750000	13.40	60.00
8.800000	13.10	60.00
8.850000	12.80	60.00
8.900000	12.50	60.00
8.950000	12.20	60.00
9.000000	11.90	60.00
9.050000	11.60	60.00
9.100000	11.30	60.00
9.150000	11.00	60.00
9.200000	10.70	60.00
9.250000	10.40	60.00
9.300000	10.10	60.00
9.350000	9.80	60.00
9.400000	9.50	60.00
9.450000	9.20	60.00
9.500000	8.90	60.00
9.550000	8.60	60.00
9.600000	8.30	60.00
9.650000	8.00	60.00
9.700000	7.70	60.00
9.750000	7.40	60.00
9.800000	7.10	60.00
9.850000	6.80	60.00
9.900000	6.50	60.00
9.950000	6.20	60.00
10.000000	5.90	60.00
10.050000	5.60	60.00
10.100000	5.30	60.00
10.150000	5.00	60.00
10.200000	4.70	60.00
10.250000	4.40	60.00
10.300000	4.10	60.00
10.350000	3.80	60.00
10.400000	3.50	60.00
10.450000	3.20	60.00
10.500000	2.90	60.00
10.550000	2.60	60.00
10.600000	2.30	60.00
10.650000	2.00	60.00
10.700000	1.70	60.00
10.750000	1.40	60.00
10.800000	1.10	60.00
10.850000	0.80	60.00
10.900000	0.50	60.00
10.950000	0.20	60.00
11.000000	0.00	60.00
11.050000	0.00	60.00
11.100000	0.00	60.00
11.150000	0.00	60.00
11.200000	0.00	60.00
11.250000	0.00	60.00
11.300000	0.00	60.00
11.350000	0.00	60.00
11.400000	0.00	60.00
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11.500000	0.00	60.00
11.550000	0.00	60.00
11.600000	0.00	60.00
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11.700000	0.00	60.00
11.750000	0.00	60.00
11.800000	0.00	60.00
11.850000	0.00	60.00
11.900000	0.00	60.00
11.950000	0.00	60.00
12.000000	0.00	60.00
12.050000	0.00	60.00
12.100000	0.00	60.00
12.150000	0.00	60.00
12.200000	0.00	60.00
12.250000	0.00	60.00
12.300000	0.00	60.00
12.350000	0.00	60.00
12.400000	0.00	60.00
12.450000	0.00	60.00
12.500000	0.00	60.00
12.550000	0.00	60.00
12.600000	0.00	60.00
12.650000	0.00	60.00
12.700000	0.00	60.00
12.750000	0.00	60.00
12.800000	0.00	60.00
12.850000	0.00	60.00
12.900000	0.00	60.00
12.950000	0.00	60.00
13.000000	0.00	60.00
13.050000	0.00	60.00
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13.450000	0.00	60.00
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14.400000	0.00	60.00
14.450000	0.00	60.00
14.500000	0.00	60.00
14.550000	0.00	60.00
14.600000	0.00	60.00
14.650000	0.00	60.00
14.700000	0.00	60.00
14.750000	0.00	60.00
14.800000	0.00	60.00
14.850000	0.00	60.00
14.900000	0.00	60.00
14.950000	0.00	60.00
15.000000	0.00	60.00
15.050000	0.00	60.00
15.100000	0.00	60.00
15.150000	0.00	60.00
15.200000	0.00	60.00
15.250000	0.00	60.00
15.300000	0.00	60.00
15.350000	0.00	60.00
15.400000	0.00	60.00
15.450000	0.00	60.00
15.500000	0.00	60.00
15.550000	0.00	60.00
15.600000	0.00	60.00

Test point: Neutral line
Operation mode: Operating mode 1
Remarks: --

Nemko S.p.A. EMC Lab.
CONDUCTED EMISSIONS ON AC MAINS
EUT: DECT 20-C08
Manuf: Shenzhen
Op Cond: See relevant paragraph of test report
Operator: D. Guarnone
Test Spec: EN 55022 class B
Comment: Charging
Neutral



Nemko S.p.A. EMC Lab.
CONDUCTED EMISSIONS ON AC MAINS

EUT: DECT 20-C08
Manuf: Shenzhen
Op Cond: See relevant paragraph of test report
Operator: D. Guarnone
Test Spec: EN 55022 class B
Comment: Charging
Neutral

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.441000	44.6	57.7
0.500000	44.6	56.0
0.550000	44.6	56.0
Frequency MHz	AV Level dBuV	AV Limit dBuV
No Results		
* limit exceeded		

5.2 Conducted disturbance on Telecommunication ports

For test instruments and accessories used see section 6.

5.2.1 Description of the test location

Test location: Shielded room

5.2.2 Photo documentation of the test set-up



5.2.3 Test result

The requirements are **Fulfilled**

Frequency range: 0.15 MHz - 30 MHz

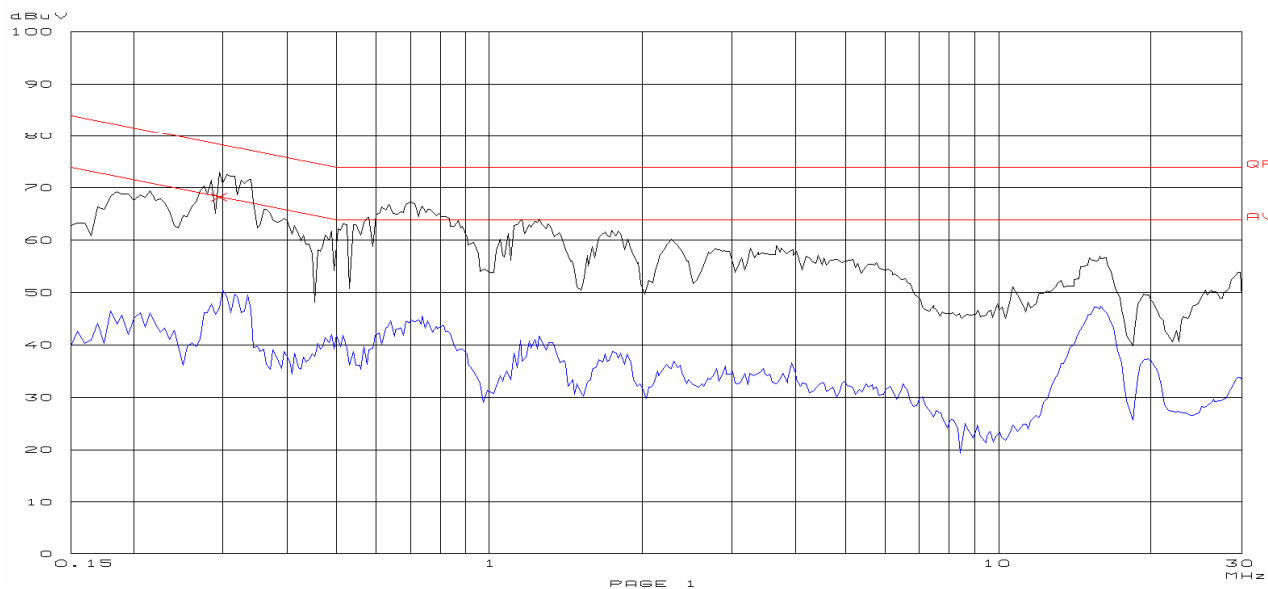
Min. limit margin: None

Remarks: The limits are kept. For detailed results, please see the following page(s).

5.2.4 Test protocol

Test point: Telecommunication Line Result:■ - passed
Operation mode: Operating mode 2
Remarks: //

Nemko S.p.A. EMC Lab.
CONDUCTED EMISSIONS ON TLC PORT
EUT: DECT20-C08
Manufacturer: Shenzhen Guo Wei Electronics Co.LTD
Op. Conf.: See relevant paragraph of test report
Operatiod: D. Guaravone
Test Spor: EN 55022 class B
Comment: Telepone line
Line engaged



Nemko S.p.A. EMC Lab.
CONDUCTED EMISSIONS ON TLC PORT
EUT: DECT20-C08
Manufacturer: Shenzhen Guo Wei Electronics Co.LTD
Op. Conf.: See relevant paragraph of test report
Operatiod: D. Guaravone
Test Spor: EN 55022 class B
Comment: Telepone line
Line engaged

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.29500	68.2	78.3
Frequency MHz	AV Level dBuV	AV Limit dBuV
No Results		
* limit exceeded		

5.3 Radiated Disturbance (Electric Field)

For test instruments and accessories used see section 6.

5.3.1 Description of the test location

Test location: Semi anechoic chamber

Test distance: 10 meter

5.3.2 Photo documentation of the test set-up



5.3.3 Test result

The requirements are **Fulfilled**

Frequency range: 30 MHz - 1000 MHz

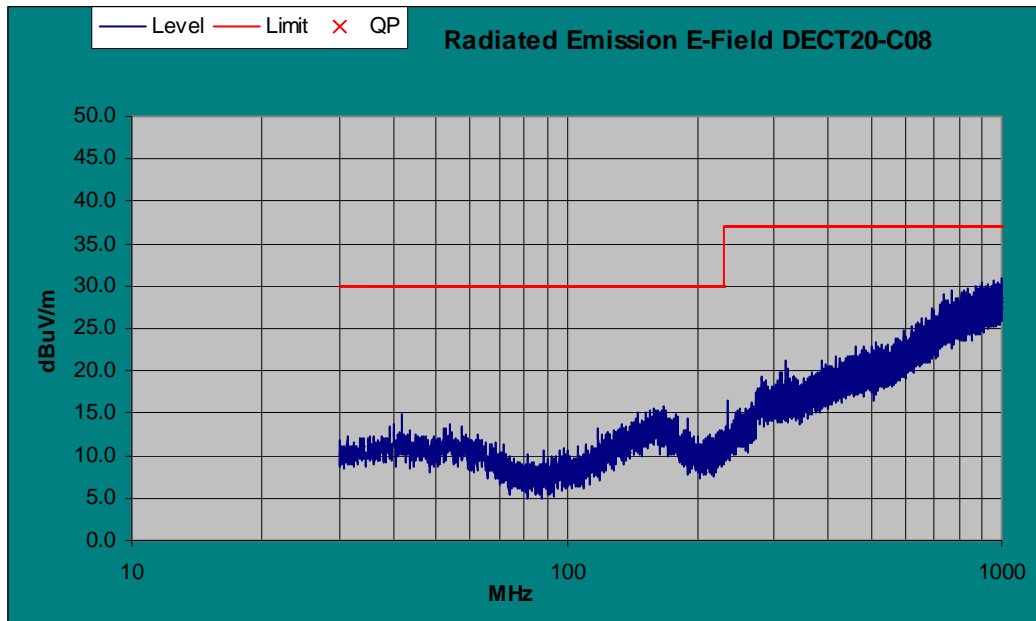
Min. limit margin: None

Remarks: The limits are kept. For detailed results, please see the following page(s).

5.3.4 Test protocol

Operation mode: Operating mode 1 / Horizontal Polarisation
Remarks: --

Result: ■ - passed

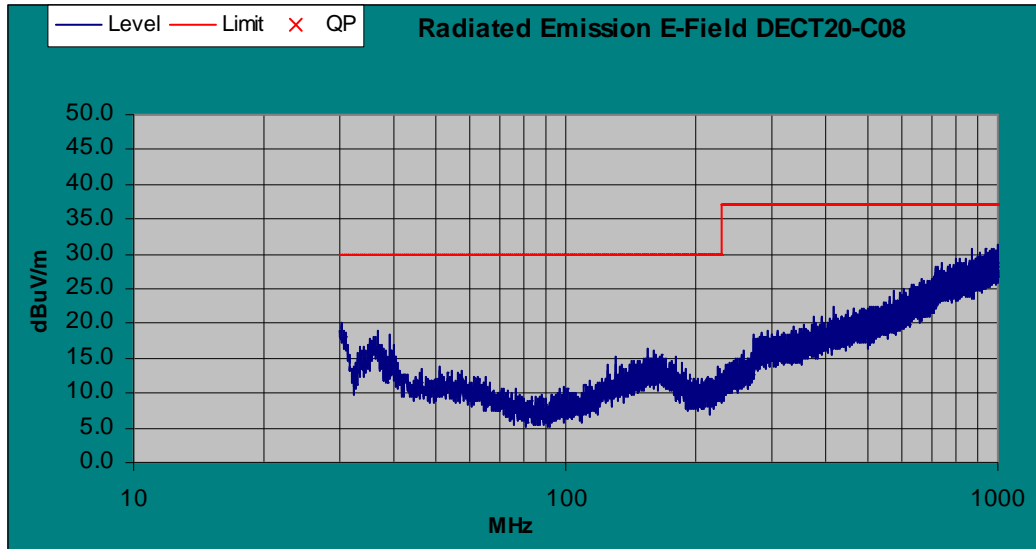


Final results:

No results

Operation mode: Operating mode 1 / Vertical Polarisation
Remarks: --

Result: ■ - passed



Final results:

No results

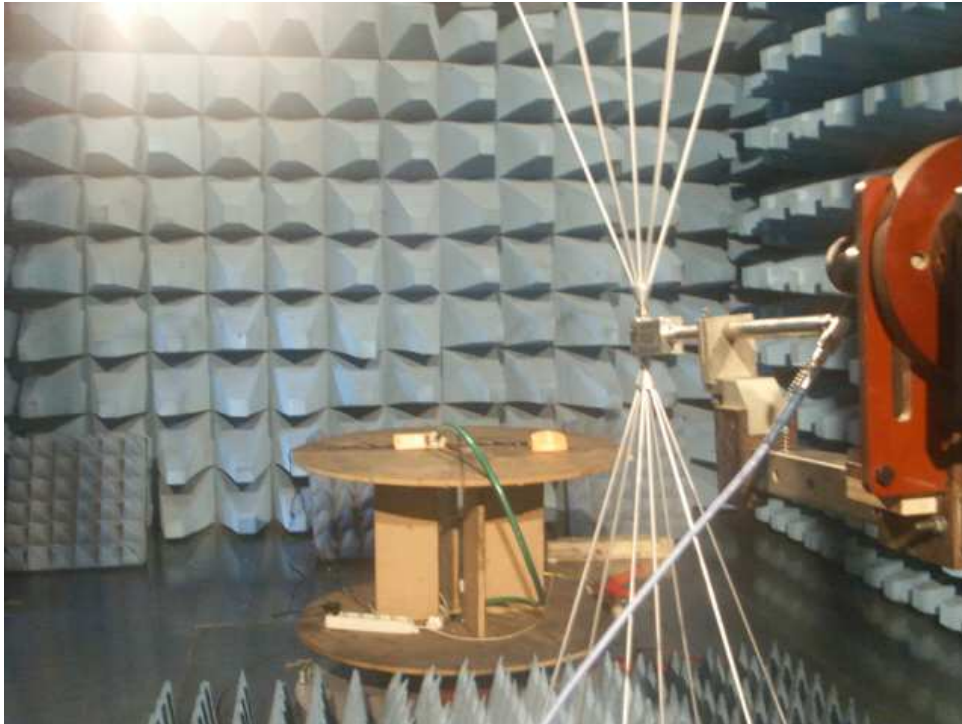
5.4 Radiated, radio-frequency, electromagnetic field

For test instruments and accessories used see section 6.

5.4.1 Description of the test location

Test location: Anechoic chamber

5.4.2 Photo documentation of the test set-up



5.4.3 Test specification:

<u>Frequency range:</u>	■ 80 MHz to 2000MHz
<u>Field strength:</u>	■ 3 V/m
<u>EuT - antenna separation:</u>	■ 2 m
<u>Modulation:</u>	■ AM: 80 % ■ sinusoidal 1000 Hz
<u>Frequency step:</u>	■ 1 % with 3 s dwell time
<u>Antenna polarisation:</u>	■ horizontal ■ vertical

5.4.4 Test result

The requirements are **Fulfilled**

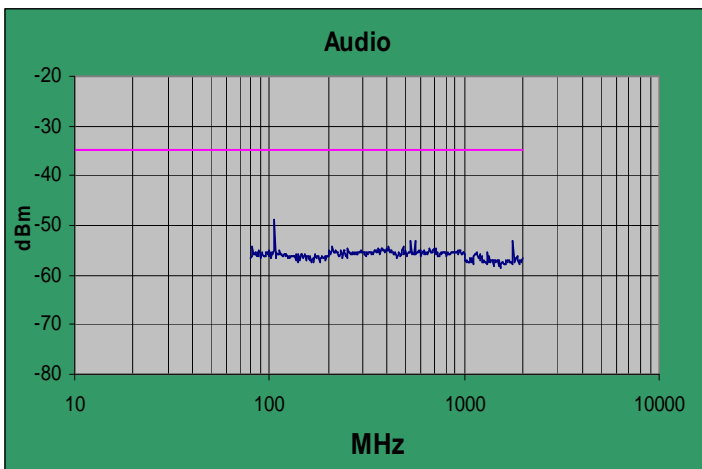
Performance Criterion **CR, CT**

Remarks: The limits are kept. For detailed results, please see the following page(s).

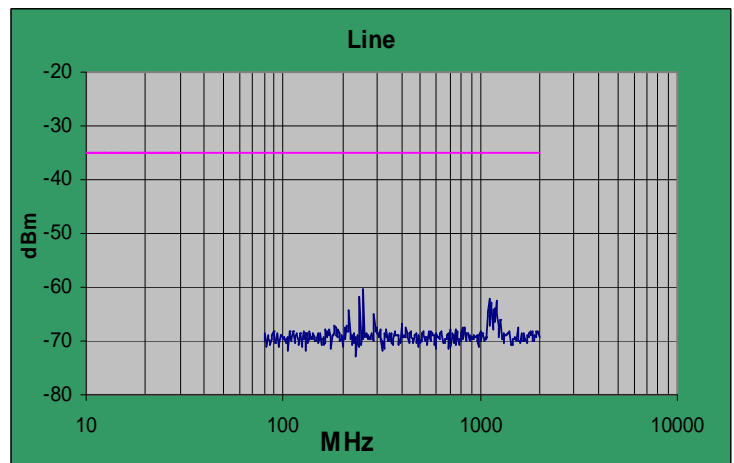
5.4.5 Test protocol

HORIZONTAL POLARIZATION

Audio

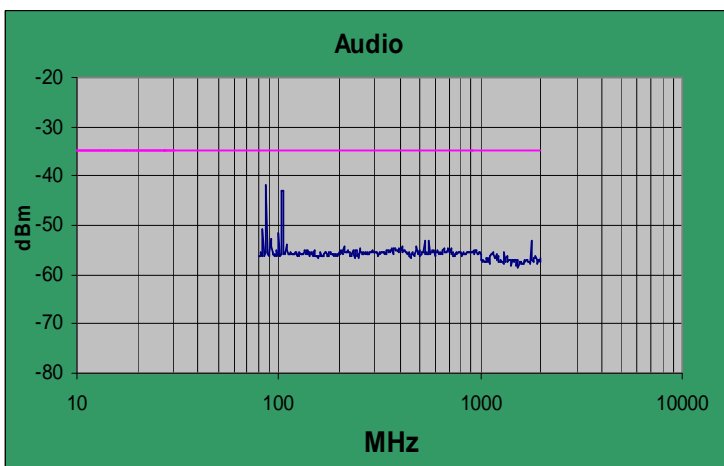


Line

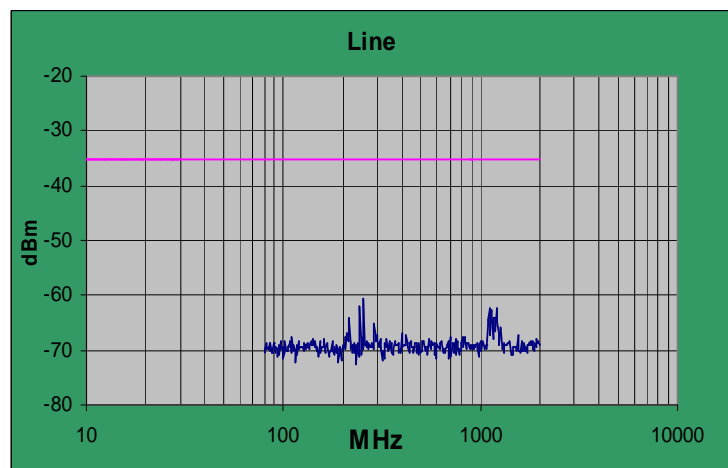


VERTICAL POLARIZATION

Audio



Line



5.5 Electrical fast transients / Burst

For test instruments and accessories used see section 6.

5.5.1 Description of the test location

Test location: Laboratory

5.5.2 Photo documentation of the test set-up



5.5.3 Test specification:

Coupling network:

- 1 kV (AC Mains)

Coupling clamp:

- 0.5 kV (Telecommunications port)

Burst frequency:

- 5.0 kHz

Coupling duration:

- ≥ 60 s

Polarity:

- positive
- negative

5.5.4 Coupling points

Cable description:	<u>AC mains ports</u>	
Screening:	<input type="radio"/> screened	<input checked="" type="checkbox"/> unscreened
	<input type="radio"/> passive	<input type="radio"/> active
	<input type="radio"/> analogue	<input type="radio"/> digital
Status:		
Signal transmission:		
Length:	<input checked="" type="checkbox"/> Plug-in	
Cable description:	<u>Telecommunication port</u>	
Screening:	<input type="radio"/> screened	<input checked="" type="checkbox"/> unscreened
	<input type="radio"/> passive	<input type="radio"/> active
	<input type="radio"/> analogue	<input type="radio"/> digital
Status:		
Signal transmission:		
Length:	<input checked="" type="checkbox"/> 1,5 m	

5.5.5 Test result

The requirements are **Fulfilled**

Performance Criterion **TR, TT**

Remarks: During the test no deviation was detected to the selected operation mode(s).

5.6 Surge

For test instruments and accessories used see section 6.

5.6.1 Description of the test location

Test location: Laboratory

5.6.2 Photo documentation of the test set-up



5.6.3 Test specification (AC mains):

Pulse amplitude – Power line sym.:

Source impedance: $2\ \Omega + 18\ \mu\text{F}$

■ 1.0 kV

Pulse amplitude-Power line unsym.:

Source impedance: $12\ \Omega + 9\ \mu\text{F}$

■ 2.0 kV

Number of surges:

■ 5 Surges/Phase angle

Phase angle:

■ 0° ■ 90° o 180° ■ 270°

Repetition rate:

■ 60 s

Polarity:

■ positive ■ negative

5.6.3 Test specification (Telecom):

Pulse amplitude-Power line unsym: ☒ 1.0 kV
Source impedance: 40 Ω + 0.5 μ F

Number of surges: ☒ 5 Surges/polarity

Repetition rate: ☒ 60 s

Polarity: ☒ positive ☒ negative

5.6.4 Coupling points

Cable description: AC mains ports

Screening: ☐ screened ☒ unscreened
☐ passive ☐ active
☐ analogue ☐ digital

Status:
Signal transmission:
Length: ☒ Plug-in

Cable description: Telecom

Screening: ☐ screened ☒ unscreened
☐ passive ☐ active
☐ analogue ☐ digital

Status:
Signal transmission:
Length: ☒ 1.5 m

5.6.5 Test result

The requirements are **Fulfilled**

Performance Criterion **TR, TT**

Remarks: During the test no deviation was detected to the selected operation mode(s).

5.7 Electrostatic discharge

For test instruments and accessories used see section 6.

5.7.1 Description of the test location

Test location: Open area

5.7.2 Photo documentation of the test set-up



Legend

C: Contact discharge

A: Air discharge

5.7.3 Test specification:Contact discharge voltage:☐ 2 kV ☒ 4 kVAir discharge voltage:☐ 2 kV ☐ 4 kV ☒ 8 kVDischarge impedance:☒ 330 Ω / 150 pFDischarge factor:☒ ≥ 1 sec.Number of discharges:☒ ≥ 10 Type of discharge:

Direct discharge	<input checked="" type="checkbox"/> Air discharge
	<input checked="" type="checkbox"/> Contact discharge
Indirect discharge	<input checked="" type="checkbox"/> Contact discharge

Polarity:☒ Positive ☒ NegativeDischarge location:

☐
☒ all external locations accessible by hand
☒ horizontal plate (HCP)
☒ vertical coupling plate (VCP)
☒ Display (handset) (A)
☒ keyboard (handset) (A)
☒ Charge contact (handset, base) (C)
☐ _____

5.7.4 Test resultThe requirements are **Fulfilled**Performance Criterion **TT, TR****Remarks:** During the test no deviation was detected to the selected operation mode(s).

5.8 Conducted disturbances induced by radio-frequency fields

For test instruments and accessories used see section 6.

5.8.1 Description of the test location

Test location: 3m anechoic chamber

5.8.2 Photo documentation of the test set-up



5.8.3 Test specification:

Frequency range:

- 0.15 MHz to 80 MHz

Test voltage:

- 3 Vrms

Modulation:

- AM: 80 %
- sinusoidal 1000Hz

Frequency step:

- 1 % with 3 s dwell time

5.8.4 Coupling points

Cable description:

AC input port

Screening:

- | | |
|--------------------------------|---|
| <input type="radio"/> screened | <input checked="" type="radio"/> unscreened |
| <input type="radio"/> passive | <input type="radio"/> active |
| <input type="radio"/> analogue | <input type="radio"/> digital |

Status:

Signal transmission:

Length:

☒ Direct plug in

Cable description:

Telephone line

Screening:

- | | |
|--------------------------------|---|
| <input type="radio"/> screened | <input checked="" type="radio"/> unscreened |
| <input type="radio"/> passive | <input type="radio"/> active |
| <input type="radio"/> analogue | <input type="radio"/> digital |

Status:

Signal transmission:

Length:

☒ 1.5 m

5.8.5 Test result

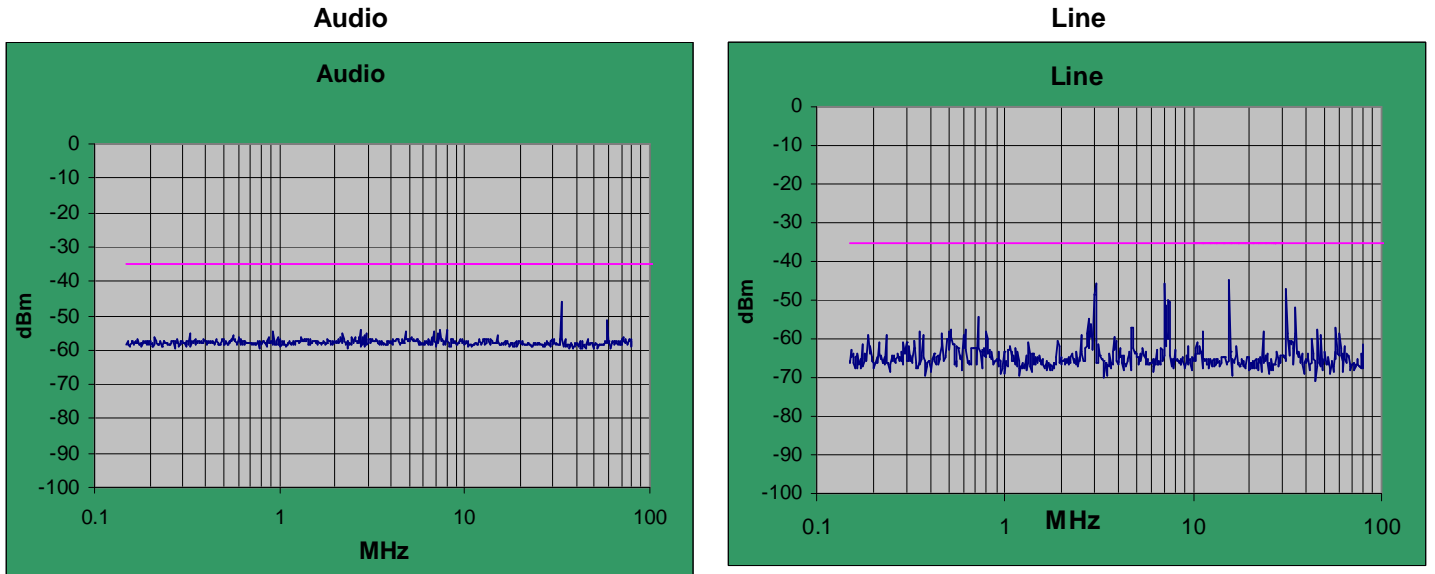
The requirements are **Fulfilled**

Performance Criterion **CT, CR**

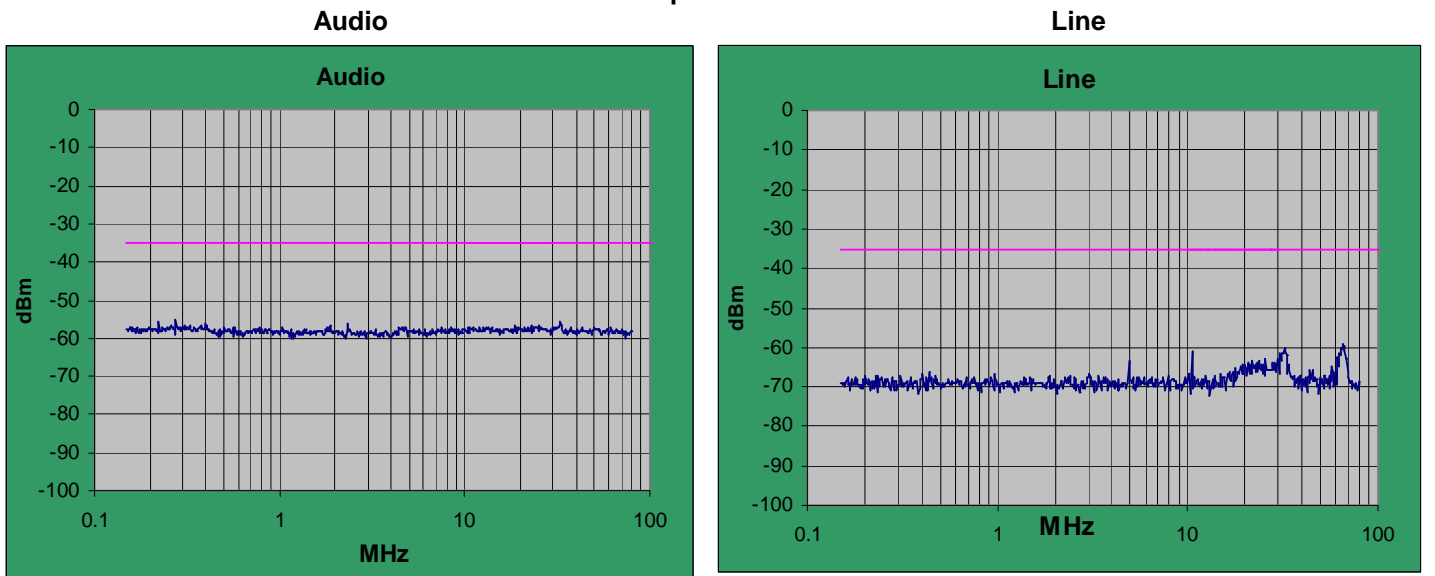
Remarks: During the test no deviation was detected to the selected operation mode(s).

5.8.6 Test protocol

AC mains



Telephone line



5.9 Voltage dips and short interruptions

For test instruments and accessories used see section 6.

5.9.1 Description of the test location

Test location: Open area

5.9.2 Photo documentation of the test set-up



5.9.3 Test specification:

Nominal Mains Voltage (V_N):

■ 230 V AC

Number of voltage fluctuations:

■ 3

Level of reduction(dip) / duration:

- a voltage dip corresponding to a reduction of the supply voltage of 30 % for 10 ms;
- a voltage dip corresponding to a reduction of the supply voltage of 60 % for 100 ms; and
- a voltage interruption corresponding to a reduction of the supply voltage of greater than 95 % for 5 000 ms.

5.9.4 Test resultThe requirements are **Fulfilled**Performance Criterion **TT,TR**

Remarks: During the interruption corresponding to a reduction of the supply voltage of greater than 95 % for 5 000 ms the link has been lost.

5.10 Harmonic current

For test instruments and accessories used see section 6.

5.10.1 Description of the test location

Test location: Laboratory

5.10.2 Photo documentation of the test set-up



5.10.3 Test result

The requirements are **Fulfilled**

Remarks: The limits are kept. For detailed results, please see the following page(s).
According to EN 61000-3-2 the E.U.T. was tested as class A equipment

5.10.4 Test protocol

Date : 15/07/2008 9.53.55 V4.16

Urms = 229.7V Freq = 49.987 Range: 0.25 A
 Irms = 0.027A Ipk = 0.153A cf = 5.665
 P = 2.485W S = 6.197VA pf = 0.401
 THDi = 91.0 % THDu = 0.10 % Class A

Test - Time : 5min (100 %)

Test completed, Result: PASSED

Order	Freq. [Hz]	Iavg [A]	Iavg%L [%]	Irms [A]	Irms% [%]	Irms%L [%]	Imax [A]	Limit [A]	Status	Vrms [V]
1	50	0.0114		0.0112	41.346		0.0127			229.79
2	100	0.0091	0.8409	0.0088	32.523	0.8124	0.0102	1.0800		0.1473
3	150	0.0090	0.3902	0.0087	32.183	0.3775	0.0100	2.3000		0.0491
4	200	0.0085	1.9696	0.0082	30.430	1.9091	0.0094	0.4300		0.0245
5	250	0.0079	0.6963	0.0077	28.563	0.6759	0.0088	1.1400		0.0245
6	300	0.0077	2.5643	0.0075	27.771	2.4974	0.0084	0.3000		0.0245
7	350	0.0071	0.9217	0.0070	25.792	0.9036	0.0077	0.7700		0.0245
8	400	0.0065	2.8377	0.0064	23.812	2.7930	0.0070	0.2300		0.0000
9	450	0.0058	1.4620	0.0058	21.437	1.4458	0.0062	0.4000		0.0000
10	500	0.0053	2.8585	0.0052	19.400	2.8444	0.0055	0.1840		0.0000
11	550	0.0000	0.0000	0.0046	17.025	1.3918	0.0047	0.3300		0.0000
12	600	0.0000	0.0000	0.0040	14.989	2.6371	0.0041	0.1533		0.0000
13	650	0.0000	0.0000	0.0035	13.009	1.6712	0.0035	0.2100		0.0000
14	700	0.0000	0.0000	0.0030	11.143	2.2872	0.0030	0.1314		0.0000
15	750	0.0000	0.0000	0.0025	9.3891	1.6886	0.0025	0.1500		0.0000
16	800	0.0000	0.0000	0.0022	8.2579	1.9372	0.0022	0.1150		0.0000
17	850	0.0000	0.0000	0.0020	7.3529	1.4988	0.0020	0.1324		0.0000
18	900	0.0000	0.0000	0.0018	6.6742	1.7614	0.0019	0.1022		0.0000
19	950	0.0000	0.0000	0.0017	6.3348	1.4431	0.0019	0.1184		0.0000
20	1000	0.0000	0.0000	0.0017	6.2217	1.8244	0.0019	0.0920		0.0000
21	1050	0.0000	0.0000	0.0016	6.1086	1.5381	0.0018	0.1071		0.0000
22	1100	0.0000	0.0000	0.0016	6.1086	1.9704	0.0018	0.0836		0.0000
23	1150	0.0000	0.0000	0.0016	5.9389	1.6378	0.0017	0.0978		0.0000
24	1200	0.0000	0.0000	0.0016	5.8824	2.0699	0.0016	0.0767		0.0000
25	1250	0.0000	0.0000	0.0015	5.6561	1.6954	0.0015	0.0900		0.0000
26	1300	0.0000	0.0000	0.0014	5.3167	2.0268	0.0015	0.0708		0.0000
27	1350	0.0000	0.0000	0.0013	4.9774	1.6113	0.0014	0.0833		0.0000
28	1400	0.0000	0.0000	0.0012	4.5814	1.8808	0.0013	0.0657		0.0000
29	1450	0.0000	0.0000	0.0011	4.1855	1.4553	0.0012	0.0776		0.0000
30	1500	0.0000	0.0000	0.0010	3.8462	1.6917	0.0011	0.0613		0.0000
31	1550	0.0000	0.0000	0.0010	3.5633	1.3245	0.0010	0.0726		0.0000
32	1600	0.0000	0.0000	0.0009	3.3371	1.5657	0.0009	0.0575		0.0000
33	1650	0.0000	0.0000	0.0009	3.1674	1.2533	0.0009	0.0682		0.0000
34	1700	0.0000	0.0000	0.0008	3.1109	1.5508	0.0009	0.0541		0.0000
35	1750	0.0000	0.0000	0.0008	3.0543	1.2817	0.0009	0.0643		0.0000
36	1800	0.0000	0.0000	0.0008	2.9977	1.5823	0.0008	0.0511		0.0000
37	1850	0.0000	0.0000	0.0008	2.9977	1.3299	0.0008	0.0608		0.0000
38	1900	0.0000	0.0000	0.0008	2.9412	1.6387	0.0008	0.0484		0.0000
39	1950	0.0000	0.0000	0.0008	2.8846	1.3489	0.0008	0.0577		0.0000
40	2000	0.0000	0.0000	0.0007	2.7715	1.6254	0.0008	0.0460		0.0000

5.11 Voltage fluctuations and flicker

For test instruments and accessories used see section 6.

5.11.1 Description of the test location

Test location: Laboratory

5.11.2 Photo documentation of the test set-up



5.11.3 Test result

The requirements are **Fulfilled**

Remarks: The limits are kept. For detailed results, please see the following page(s).

5.11.4 Test protocol

Operation mode: Normal working
Remarks: --

Result: ■ - passed

Urms = 229.9V Freq = 50.000 Range: 0.25 A
Irms = 0.026A Ipk = 0.164A cf = 6.319
P = 2.282WS = 5.978VA pf = 0.382
THDi = 92.2 % THDu = 0.10 % Class A

Test - Time : 1 x 10min = 10min (100 %)

LIN (Line Impedance Network) : L: 0.24ohm +j0.15ohm N: 0.16ohm +j0.10ohm

Limits :	Plt : 0.65	Pst : 1.00
	dmax : 4.00 %	dc : 3.30 %
	dtLim: 3.30 %	dt>Lim: 500ms

Test completed, Result: PASSED

Pst	dmax	dc	dt>Lim
	[%]	[%]	[ms]
0.072	0.000	0.000	0.000

6 USED TEST EQUIPMENT

Radiated disturbance (electric field) – 55011 / 55022 - 10m Chamber

<i>Equipment</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Serial N°</i>
Trilog Broad Band Antenna 25 MHz÷2 GHz	Schwarzbeck	VULB 9168	VULB 9168-242
RF Analyzer + display unit	R&S	ESBI-RF + ESAI-D	828 038/003 829 808/005
Analyzer RF unit	R&S	FSAC FSA-D	860 053/014 894 993/038
RF receiver 20 ÷ 1000 MHz	R&S	ESVS 30	829 007/007
Turn-table	R&S	HCT	835 803/03
Antenna mast	R&S	HCM	836 529/05
Controller	R&S	HCC	836 620/7
Semi-anechoic chamber	Nemko	10m semi- anechoic chamber	530
Shielded room	Siemens	10m control room	1947

Conducted disturbance - 55011 / 55022

<i>Equipment</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Serial N°</i>
RF receiver 9 kHz ÷ 30 MHz	R&S	ESHS 30	828 765/012
LISN 9 kHz ÷ 30 MHz	R&S	ESH2-Z5	881 362/006
Coupling/decoupling network	Rohrbacher	CDN 801-T2	60114
Shielded room	Siemens	Conducted emission test room	1862

Harmonic current & Voltage fluctuations and flicker – 61000-3-2 / 61000-3-3

<i>Equipment</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Serial N°</i>
Mains analyzer	EMC Partner	Harmonics 1000	016

Radiated, radio-frequency, electromagnetic field – 61000-4-3

<i>Equipment</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Serial N°</i>
Log periodic antenna 200 ÷ 1000 MHz	R&S	HUF-Z3	893 232/005
Biconical antenna 20 ÷ 300 MHz	Schwarzbeck	VHBC 9133	9133-074
Microwave Horn antenna 0.8 ÷ 4.2 GHz	Amplifier Research	AT4002A	300773
RF generator 0.1 ÷ 2000 MHz	R&S	SMH	860 291/053
RF amplifier 80 ÷ 1000 MHz	IFI	SMC100 PS5000	1754-0696
RF amplifier 0.8 ÷ 4.2 GHz	Amplifier Research	50S1G4A	301049
Power meter	R&S	NRVD	833697/027
Thermal power sensor	R&S	NRV-Z55	100300
Bidirectional Coaxial coupler	NARDA Microline	3020A	90101
Coaxial coupler	Amplifier Research	DC7144	301249
Semi-anechoic chamber	Nemko	3m semi-anechoic chamber	70
Shielded room	Siemens	3m control room	3
Audio Analyzer 2 Hz – 300KHz	R&S	UPD	838 358/001
Microphone	Bruel & Kjaer	4165	1120379
Microphone power supply	Bruel & Kjaer	2807	888535
PSTN feeding bridge	Nemko	TEL1H22U	0144

Electrostatic discharge – 61000-4-2

<i>Equipment</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Serial N°</i>
ESD Test system	EMC Partner	ESD3000	252

Electrical fast transients / Burst – 61000-4-4

<i>Equipment</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Serial N°</i>
Pulse generator	EMC partner	Transient 2000	849
Coupling clamp	EMC partner	CDN	CNEFT1000-120

Conducted disturbances induced by radio-frequency fields 61000-4-6

<i>Equipment</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Serial N°</i>
Signal Generator 100kHz-1000MHz	R&S	SMX	883179/001
Wideband RF amplifier 8 kHz ÷ 225 MHz	Kalmus	210LC	060793-2
Coupling/decoupling network	Rohrbacher	CDN 801-M2	60118
Coupling/decoupling network	Rohrbacher	CDN 801-T2	60114
Audio Analyzer 2 Hz – 300KHz	R&S	UPD	838 358/001
Shielded room	Siemens	3m control room	3
Microphone	Bruel & Kjaer	4165	1120379
Microphone power supply	Bruel & Kjaer	2807	888535
PSTN feeding bridge	Nemko	TEL1H22U	144

Voltage dips and short interruptions – 61000-4-11

<i>Equipment</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Serial N°</i>
Pulse generator	EMC partner	Transient 2000	849

Surge – 61000-4-5

<i>Equipment</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Serial N°</i>
Coupling network	Schaffner	CDN 116	149 9318
Pulse generator	EMC partner	Transient 2000	849

Environmental conditions - ALL

<i>Equipment</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Serial N°</i>
Thermohygrometer data loggers	TESTO	175-H2	20012380/305

7 PHOTOS







